

## Life-Cycle Assessment and Energy Systems Models

Life-cycle assessment (LCA) provides:

- Quantitative assessment of the environmental impacts due to a specified product or service over the lifetime of that product or service.
- Figure 1 shows the phases and applications for LCA per international standard governing its application (International Organisation for Standardisation, 2006).
- Figure 1 makes it clear that LCA is an interesting application for strategic planning and public policy making.
- Good complement to energy systems models included in the ESA<sup>2</sup> portfolio.

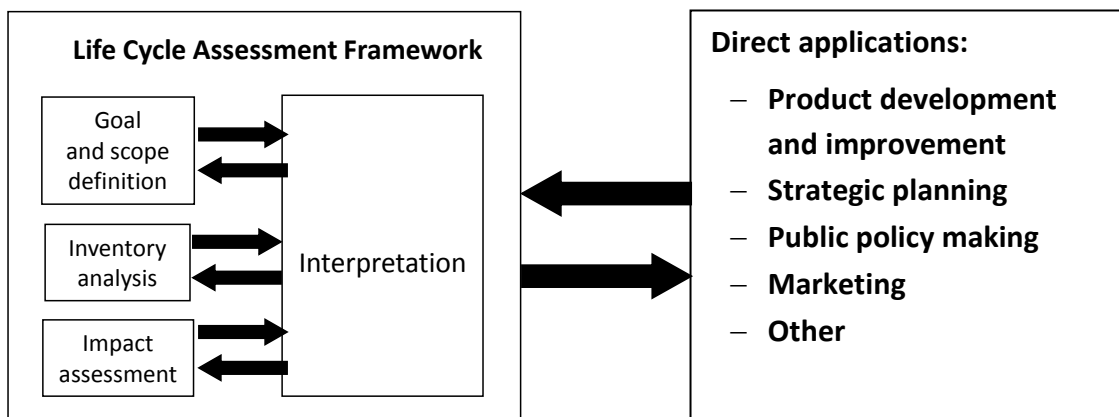


Figure 1: The phases of life-cycle assessment (based on (International Organisation for Standardisation, 2006))

### Exemplary application

A good example of combining LCA with energy systems analysis is given by (Bjorklund, 2012, Björklund, 2008):

- Environmental impacts due to energy supply for Finspång municipality, Sweden in 2020
- Assessed changes in impacts due to policy initiatives such as increased public transport, increased CHP production, increased use of pellets boilers
- Impacts assessed (based on policy priorities): global warming potential, photochemical oxidation, acidification, eutrophication, and emissions of NO<sub>x</sub>, SO<sub>x</sub>, NH<sub>3</sub>

### References

- BJORKLUND, A. 2012. Life cycle assessment as an analytical tool in strategic environmental assessment. Lessons learned from a case study on municipal energy planning in Sweden. *Environmental Impact Assessment Review*, 32, 82-87.
- BJÖRKLUND 2008. Livscykelanalys av åtgärder för minskad energianvändning i Finspång. Rapport från ett projekt om metoder för strategisk miljöbedömning i energiplanering. .
- INTERNATIONAL ORGANISATION FOR STANDARDISATION 2006. Environmental management - Life cycle assessment - Principles and Framework. Geneva: International Organisation for Standardisation.